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## DRY CLEANING DETERGENT

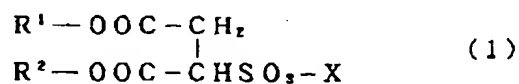
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Abstract (amended)Objective

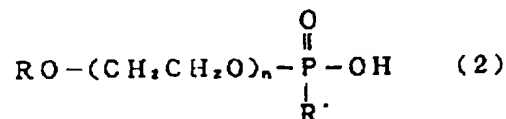
To provide a dry cleaning detergent that has excellent water-solubility and can be used in the preparation of a uniform sasara [transliteration] liquid in the case using a petroleum solvent.

Means to solve

A dry cleaning detergent containing (A) a sulfosuccinic acid salt of the general formula (1), (B) a phosphoric acid ester of the general formula (2), (C) an alkanolamine, (D) a sorbitan fatty acid ester, and (E) a petroleum solvent.



(Where  $R^1$  and  $R^2$  are  $C_{6-18}$  alkyl or alkenyl groups, and  $X$  is an alkali metal or an alkaline-earth metal.)



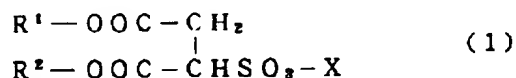
(Where  $R$  is a  $C_{8-20}$  alkyl or alkenyl group,  $R'$  is  $-OH$  or  $RO-(CH_2CH_2O)_n-$ , and  $n$  is a number of 1-6 on average.)

Claim

1. A dry cleaning detergent containing

(A) a sulfosuccinic acid salt of the following general formula (1)

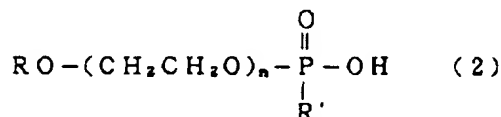
[Structure 1]



(where  $R^1$  and  $R^2$  are  $C_{6-18}$  alkyl or alkenyl groups, and  $X$  is an alkali metal or an alkaline-earth metal),

(B) a phosphoric acid ester of the general formula (2),

[Structure 2]



(where R is a C<sub>8-20</sub> alkyl or alkenyl group, R' is -OH or RO-(CH<sub>2</sub>CH<sub>2</sub>O)<sub>n</sub>-, and n is a number of 1-6, on average),

(C) an alkanolamine

(D) a sorbitan fatty acid ester, and

(E) a petroleum solvent.

### Detailed explanation of the invention

[0001]

#### Technical field of the invention

The present invention relates to a dry cleaning detergent using a petroleum solvent as a washing medium.

[0002]

#### Prior art

In dry cleaning that uses a petroleum solvent consisting of a mixture of paraffin-type, cycloparaffin-type, and aromatic-type hydrocarbons and so on, a variety of surfactants have been used in order to remove water-soluble dirt or solid dirt, to prevent recontamination, to inhibit electrostatic charging, and to render softening capability. In general, the dry cleaning detergent is a liquid detergent obtained by the blending of 5-80 wt% of a surfactant, a petroleum solvent, a viscosity-reducing agent, a corrosion inhibitor, etc. During dry cleaning, this liquid detergent is used at a ratio of 0.1-5 vol% with respect to the petroleum solvent.

[0003]

However, in dry cleaning with a petroleum solvent, it is common that, prior to washing, in a dry cleaning machine, in order to remove water-soluble dirt or stains which come off with difficulty by washing, a spray or brushing treatment with a treatment liquid is carried out and then washing is conducted. The common recipe of this treatment liquid is a petroleum solvent/a dry cleaning detergent/water = 8/1/1 (volumetric ratio). In general, this treatment liquid is called sasara liquid.

[0004]

When a uniform sasara liquid cannot be prepared, the amount of water blended is decreased. There is a problem in which the effectiveness in removing the water-soluble dirt is low. In order to prepare a uniform sasara liquid, it is required that the dry cleaning detergent using a petroleum solvent have water-solubility.

[0005]

Problems to be solved by the invention

Therefore, a dry cleaning detergent that has excellent water-solubility and can be used for the preparation of a uniform sasara liquid with respect to a petroleum solvent is highly desired.

[0006]

Means to solve the problems

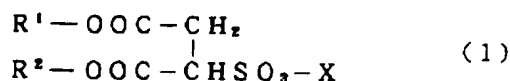
As a result of zealous investigations on a dry cleaning detergent that can be used for the preparation of a uniform sasara liquid, the present inventors have discovered that a composition containing a specific anionic surfactant, an alkanolamine, and a nonionic surfactant is appropriate for this objective. The present invention has been achieved.

[0007]

In other words, the present invention provides a dry cleaning detergent containing (A) a sulfosuccinic acid salt represented by the following general formula (1)

[0008]

[Structure 3]



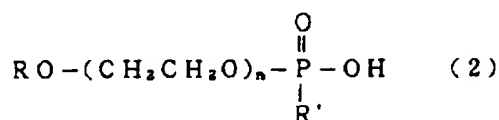
[0009]

(where  $\text{R}^1$  and  $\text{R}^2$  are  $\text{C}_{6-18}$  alkyl or alkenyl groups, and X is an alkali metal or an alkaline-earth metal),

(B) a phosphoric acid ester represented by the following general formula (2),

[0010]

[Structure 4]



[0011]

(where R is a C<sub>8-20</sub> alkyl or alkenyl group, R' is -OH or RO-(CH<sub>2</sub>CH<sub>2</sub>O)<sub>n</sub>-, and n is a number of 1-6, on average),

(C) an alkanolamine,

(D) a sorbitan fatty acid ester, and

(E) a petroleum solvent.

[0012]

Embodiment of the invention

Component (A) of the present invention is a sulfosuccinic acid salt represented by the general formula (1). It is preferable that R<sup>1</sup> and R<sup>2</sup> are alkyl groups or alkenyl groups in the range of C<sub>6-12</sub> and X is sodium. The preferred component (A) is a dialkyl sulfosuccinic acid salt. Specifically, dioctyl sulfosuccinic acid sodium salt, di-2-ethylhexyl sulfosuccinic acid sodium salt, didecyl sulfosuccinic acid sodium salt, didodecyl sulfosuccinic acid sodium salt, and so on are available.

[0013]

Component (B) of the present invention is the phosphoric acid ester represented by the general formula (2). It is preferable that R is a linear or branched alkyl group in the range of C<sub>10-16</sub> and n is a number of 2-4, on average. Furthermore, with a sesquiphosphoric acid ester as a mixture of a monobody and a dibody at a molar ratio of about 1/1, an especially good synergistic effect for water solubilization is observed, in comparison to monophosphoric acid ester or diphosphoric acid ester.

[0014]

As the preferred alkanolamine for component (C) of the present invention, monoethanolamine, diethanolamine, triethanolamine, and so on are examples. In particular, triethanolamine is preferred.

[0015]

Component (D) of the present invention is a sorbitan fatty acid ester with an HLB value of 4-10 or so. Sorbitan monolaurate (HLB = 8.6) is an example.

[0016]

There are no special restrictions on the petroleum solvents as component (E) of the present invention. They include paraffin-type hydrocarbons (boiling points 120-220°C), cycloparaffin-type hydrocarbons, and aromatic-type hydrocarbons. Those commonly used as dry cleaning solvents can be mentioned.

[0017]

It is preferable that the composition of the present invention contain components (A), (B), (C), (D), and (E) at 5-30 wt%, 5-20 wt%, 1-5 wt%, 10-50 wt%, and 15-79 wt%, especially 10-22 wt%, 8-12 wt%, 2.4-3.6 wt%, 25-42 wt%, and 20-55 wt%, respectively. In these ranges, a composition that can be used in the preparation of a sasara liquid that is stable, excellent in water-solubility, and uniform can be obtained.

[0018]

In the dry cleaning detergent of the present invention, in addition to these necessary components, as agents for improving the liquid stability during storage and for reducing the viscosity, methanol, ethanol, isopropanol, butanol, and other lower alcohols, butyl Cellosolve, and other alcohol ethers, and so on can be blended. Furthermore, it is also possible to blend benzotriazole or other metal corrosion inhibitors, antibacterial agents, water, etc.

[0019]

Application examples

Application Examples 1-4 and Comparative Examples 1 and 2

The dry cleaning detergents with compositions shown in Table 1 were prepared, and water-solubilizing capabilities were tested. The results are shown in Table 1.

[0020]

Water-solubility test

(1) State during mixing

A material with a ratio of a dry cleaning petroleum solvent (Exxon D-40, manufactured by Exxon Chemical Co., Ltd.)/dry cleaning detergent/ion-exchange water = 8 mL/1 mL/1 mL was placed in a test tube. The state during good shaking and mixing was observed by visual

inspection. Since transparency during mixing is a condition for the ease in the preparing a sasara liquid, the evaluation was judged by the consideration of this point according to the following criteria:

O: Transparent during mixing

Δ: Semi-transparent during mixing

X: Opaque during mixing

## (2) Water solubilization amount

100 mL Exxon D-40 and 1 mL of a dry cleaning detergent were placed in a 200-mL emulsification test tube. While ion-exchanged water was being added in a small amount with a microsyringe, it was stirred vigorously each time. After stirring, it was allowed to stand and observed by visual inspection. The amount of ion-exchanged water added until the solution had a white turbidity was the maximum solubilization amount (mL).

[0021]

Table 1

① 配合量(重量%)		実施例②				比較例③	
		1	2	3	4	1	2
(A)	ジ-2-エチルヘキシルスルホコハク酸ナトリウム④	20	18	14	11	20	—
(B)	ポリオキシエチレンラウリルエーテルセスキリン酸エステル* <sup>1</sup> ⑤	10	10	10	10	—	10
(C)	トリエタノールアミン⑥	3	3	3	3	—	3
(D)	ソルビタンモノラウレート⑦	27	30	35	40	10	56
(E)	石油系溶剤* <sup>2</sup> ⑧	40	39	38	36	70	31
⑨ 評価結果	混合時の状態⑩	○	○	○	○	×	×
	水の可溶化量(ml)⑪	0.15	0.15	0.16	0.18	0.02	0.01

\*<sup>1</sup>: Ethylene oxide 3 mol adduct

\*<sup>2</sup>: Commercial product name, manufactured by Nippon Petroleum Co., Ltd.

- Key:
- 1 Amounts added (wt%)
  - 2 Application example
  - 3 Comparative example
  - 4 Di-2-ethylhexyl sulfosuccinic acid sodium salt
  - 5 Polyoxyethylene lauryl ether sesquiphosphoric acid ester\*<sup>1</sup>
  - 6 Triethanolamine
  - 7 Sorbitan monolaurate



- 8 Petroleum solvent\*<sup>2</sup>
- 9 Evaluation results
- 10 State during mixing
- 11 Water solubilization amount (mL)

[0022]

#### Effect of the invention

The dry cleaning detergent of the present invention is uniform, transparent, and excellent in phase stability. Furthermore, it has excellent water-solubility. Therefore, it is possible to prepare a uniform sasara liquid with respect to a dry cleaning petroleum solvent.